1. Determine if the following statement is True or False. If the statement is false, provide a counterexample or provide a justification.
   (a) I $F$ and $G$ are antiderivatives of $f$, then $F = G$.
   (b) The antiderivative of $\sec^2(3x)$ is $\frac{1}{3}\tan(3x)$.
   (c) The inde
   nite integral of a function $f$ is the collection of all antiderivatives of $f$.
   (d) We know how to find the antiderivative of $e^{x^2}$, and it is $e^{x^2}$.
   (e) $F$ and $G$ are antiderivatives of $f$ and $g$, then antiderivative of $FG$ is $fg$.
2. Evaluate the following inde
   nite integrals.
   (a) $\int(\sqrt[3]{x} - \frac{1}{x})^3 dx$.
   (b) $\int(3^{-x} + e^{-5x})dx$.
   (c) $\int \frac{e^{\sqrt{2}}+x^{\sqrt{2}}}{\sqrt{x}}$.
3. (Optional): Evaluate $\int \sqrt{\tan(x)}dx$.